The Center Scene

WINTER 1991
U.S. Geological Survey/EROS Data Center

# EOSDIS: The core of a program

In the last issue of Center Scene, "EOS: An Important Initiative" the technical systems critical to the EROS Data Center's involvement in the planned Earth Observing System program under NASA: Mission to Planet Earth were summarized. EOS represents an important scientific initiative and the research potential offers the Center opportunities and challenges well into the 21st century.

But, how will the Center be involved? What will we do? Will there be a larger staff? These and many other questions are being addressed.

If one were to follow the previously published design documents he would find that the USGCRP is sponsoring an EOS, which, in turn, breaks down into an EOSSRP, EOSSMS, and EOSDIS, with design oversight and guidance provided in part, by an IWG. An EOSDIS ECS focuses on a SDPS, where the main element is a DAAC, composed of a DADS, a PGS, and an IMS, that gets its data from EOS by way of a CDOS. Briefly summarized, that is the major thrust.

Now, what does that mean? And, where does the Center fit in? In actuality, the work accomplished by EROS Data Center employees for twenty years has contributed significantly to our position within EOS.

The U.S. Global Change Research Program (USGCRP) is an interagency program created to study the Earth as a system in order to monitor and eventually permit predictions of global environmental change caused by both natural and human activities. The Earth Observing System, guided in design and development by an Investigator Working Group (IWG), is by far the largest component of the USGCRP.

EOS will establish an integrated science program to investigate earth systems, develop and operate a system for data acquisition, and establish a system for providing data to the scientific community. Three components of EOS then are important:

*EOS Data Systems Project Team: John Boyd, resident systems engineer, Phyllis Spanton, secretary, R.J. Thompson, chief, project office, Lyn Oleson, Version 0 project manager, Bruce Quirk, EDC/GSFC interface manager. Not pictured: Bryan Bailey, DAAC project scientist, Science & Applications Branch*

- the EOS Scientific Research Program (EOSSRP) will focus on how the Earth functions as a closed system.
- the EOS Space Measurement System (EOSSMS) includes the instruments, space platforms and associated facilities that will be acquiring the global measurements.
- the EOS Data and Information System (EOSDIS) is to provide fast, easy, reliable, and open access to all data.

EOSDIS will aid in communication and exchange of EOS data throughout the research community. A contractor-designed EOSDIS Core System (ECS) will provide the hardware, software, documentation, training, and service components necessary to handle EOS data. Though the first version of the ECS will not be delivered until the mid 1990's, there is a critical need to provide immediate access to pre EOS data for use in scientific investigations and in determining at-launch EOS data products. Since pre EOS data exist in many forms and at numerous international locations, an early version of the EOSDIS system will be designed to access those data. A Science Data Processing Segment (SDPS) will provide the data management services necessary to archive the data, process user requests, generate customer products, and distribute those data products to the international science community.

The backbone of the Science Data Processing Segment is the establishment of a series of Distributed Active Archive Centers (DAACs). Each DAAC, selected based on relevant expertise in designated scientific disciplines, will receive, process, archive, and distribute EOS data sets. Each DAAC will have a:

- Data Archive and Distribution System (DADS)
- Product Generation System (PGS)
- Information Management System (IMS)

The EROS Data Center, given a 20 year history of archiving, processing, and distributing satellite and aircraft data sets relevant to land phenomena, has been designated the Land Processes DAAC for EOS. As the Land Processes

*(continued on page 3)*

# UP FRONT

In this column I often summarize programs, policies, and initiatives important to the Center. Last issue, for example, I reviewed the exciting future plans for NASA's EOSDIS activities at EDC.

This time, however, I would like to look at another aspect of the Center and our staff about which we can be proud. Employee support of the fall Sioux Empire United Way and Combined Federal Campaigns, the Christmas Friendship Tree program, and the response to the recent Banquet serving reflect the quality of persons working here and say a great deal about the impact we have on the communities around us.

United Way employee giving exceeded $13,000; federal employee pledges and contributions to the Combined Federal Campaign (CFC), up 17% from the previous year, were over $9,000. Johnson Controls' matching program for their employee contributions means that over $37,000 was raised for the United Way and CFC. Additionally, a number of employees serve as volunteers at the YMCA, YWCA, Volunteer and Information Center, the Children's Inn and other local United Way agencies.

The response to this last season's Friendship Tree program continued a fine holiday employee tradition. Habitat for Humanity received over $720, the Banquet — $400, and a large assortment of packages and food supplies were delivered to the Union Gospel Mission.

Continuing that great response was your reaction to the call for assistance as Center employees supported a soup and sandwich meal for guests at the Banquet on February 12.

There are many more ways you have stepped forward when the call for help comes. The spirit of sharing mentioned above only notes a few recent examples. As we begin new and important programs, I'm sure you will always keep in mind the needs of those less fortunate in our community.

*This puplication is printed on recycled paper.*

1 9 8 9
INTERNATIONAL
FILM&TV FESTIVAL
OF NEW YORK

FINALIST AWARD

PRESENTED TO

USGS/EROS Data Center
for
"Special Olympics: The Chance of a Lifetime"

GERALD M. GOLDHIRSH
PRESIDENT

*Finalist certificate honoring EDC community service video, "Special Olympics: The Chance of a Lifetime," from the 32nd Annual International Film & TV Festival of New York. The festival honors the world's best non-broadcast education, information and industrial productions.*

# EDC'S AWARD WINNING PRODUCTION GROUP

Since winning a bronze medal at the 30th Annual New York International Film & TV Festival in January of 1987 for a videotape titled, "Geographic Information Systems: Man & Nature," the EROS Data Center's video production prowess has spread throughout the Department of the Interior.

Because of the reputation EDC has built, several bureaus and offices within the Interior Department have approached Data Center management about EDC helping them produce their video productions.

While continuing to produce in-house pieces, the crew accepted a few of these major projects. The first endeavor involved a five-minute video for the USGS Product Distribution Policy Office (PDPO) at U.S. Geological Survey (USGS) headquarters in Reston. Titled, "Go Places With USGS Maps," the six-and-a-half-minute presentation serves as a recruiting tool for prospective USGS topographic map dealers. The Survey's PDPO was delighted to learn that it could get a quality video produced in South Dakota for 1/8th the cost of production in the Washington, D.C. video market.

Another external project that the Data Center elected to prepare was a community service piece for the South Dakota Special Olympics program. Through the cooperation of Ron Risty, Customer Services Supervisor, and Deb Voigt, Executive Director of the South Dakota Special Olympics Office, the Data Center produced a twelve-and-a-half-minute video for the general public, civic groups, and public schools to help raise funds and recruit new volunteers.

According to Lee McManus, Creative Director on the project, the video, "Special Olympics: The Chance of a Lifetime," was a nice change of pace for him and his staff.

"Given the nature of the Data Center and its customers, we end up shooting a lot of computers and computer screens dealing with complex scientific information. The Special Olympics tape was a nice chance for me and my staff to get away from the technical subject matter and be creative in a different way by contributing to a good cause."

"To have a tape of such high quality that is personalized to our State's program has been a huge asset," said Deb Voigt, Executive Director of South Dakota Special Olympics. "It assists us in spreading the word about what Special Olympics is to potential donors, to our volunters, to civic organizations and to the general public. We greatly appreciate the efforts of the EROS Data Center and its imployees for their hard work and dedication that made this porject possible."

While South Dakota Special Olympics

***(continued on page 4)***

## EOSDIS: The core of a program

*(continued from page 1)*

DAAC, we must be prepared to process, archive, and distribute land related data including that collected historically as well as new data collected by the EOS. To coordinate, design, and develop the Land Processes DAAC with the EOSDIS project manager at NASA and with other DAAC's an EOS Data Systems Project Office has been established at EDC.

The EOS Data Systems Project Office (EDSPO) will provide the systems engineering, analysis and project management personnel necessary to represent the Division's interests and policies during the definition of facility responsibilities, data flow characteristics, equipment specifications and operating procedures. The Chief, EDSPO will be responsible for insuring that EDC and NMD management personnel are informed about project requirements, and will represent NMD management direction, policy and priorities to program managers in NASA, NOAA and other affected organizations and in interagency meetings and working groups.

R.J. Thompson has been temporarily assigned to the position of Chief, EOS Data Systems Project Office. In this capacity, he will also serve as the project manager for implementation of the Land Processes DAAC, and is responsible for overall coordination and management of tasks necessary for the evolutionary development of that capability.

Bryan Bailey will serve as the DAAC Project Scientist, responsible for providing scientific oversight to the projects and tasks to be carried out in preparation for participation in EOSDIS. An important element of this responsibility is the formulation of a DAAC science support plan, including a science advisory panel, that will guide DAAC services to the community and assist in coordination with EOSDIS Project science personnel, other DAACs and their science communities.

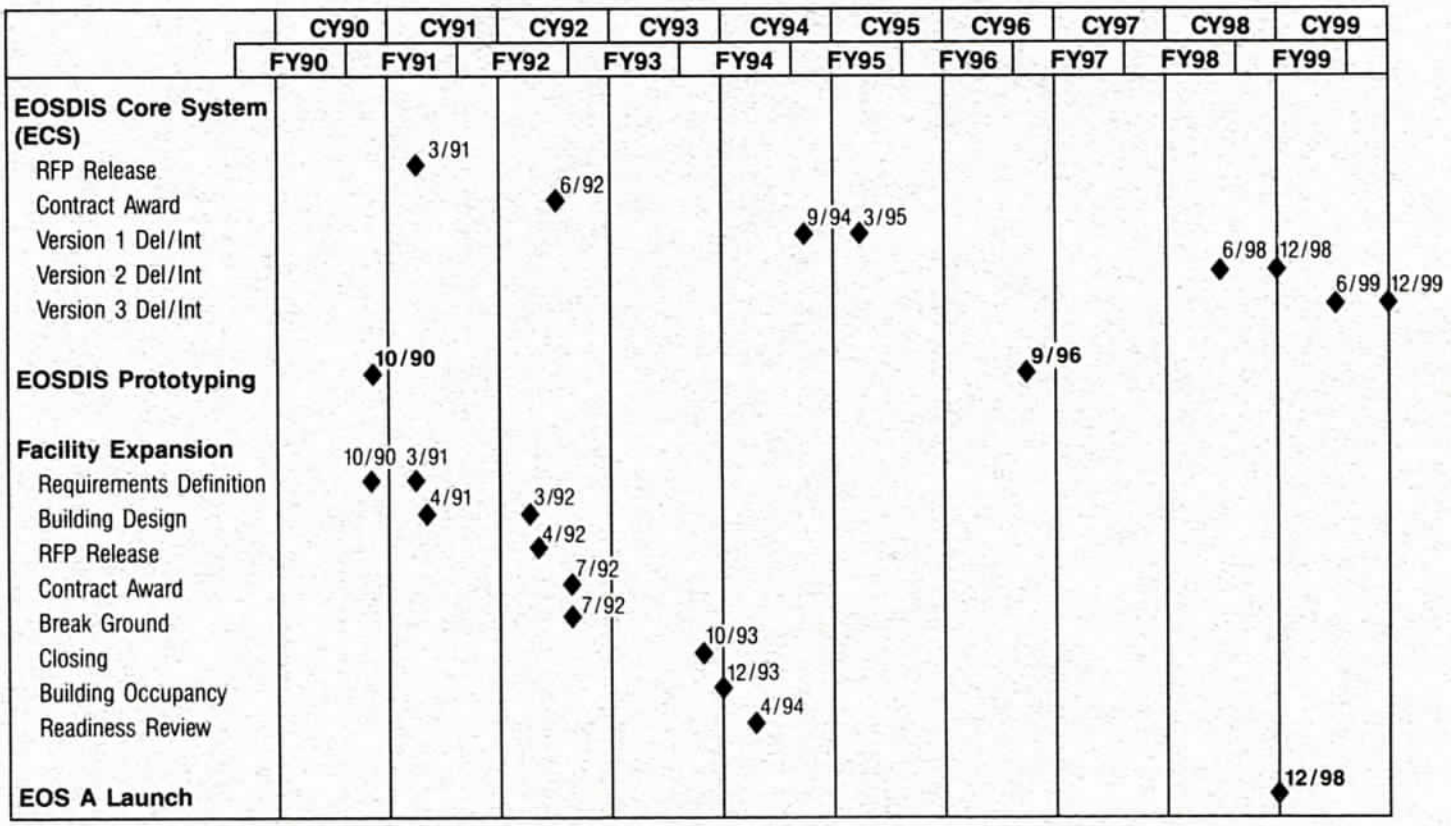
John Boyd is the resident systems engineer, responsible for developing, coordinating and representing EDC's input to the systems definition, engineering and integration activities of the EOSDIS project. John will place particular emphasis on technical specifications for and development of the major systems development contract (Phase C/D).

Lyn Oleson's priority near term task is to manage the early prototyping activities that EDC will participate in, as we move toward implementation of advanced information systems, product generation systems and data archives management.

Bruce Quirk has agreed to relocate to the Goddard Space Flight Center, while continuing to work for EDSPO, in order to provide continuing on-site representation for Land Processes DAAC issues. Bruce will provide daily liaison with all EOS and EOSDIS meetings, task teams and study groups that are relevant to land data. In addition, Bruce will be EDC's representative on the Technical Advisory Committee for the Phase C/D contract technical evaluation.

The assignments reflected here will provide conduits for communication and coordination between EDC activities and those being carried out in other EOSDIS facilities, however the majority of technical work required to support DAAC evolution will have to be done in the various EDC technical organizations.

# EOSDIS LAND PROCESSES DAAC DEVELOPMENT SCHEDULE



## EDC'S AWARD WINNING PRODUCTION GROUP

*(continued from page 2)*

officials were pleased with the videotape, the program also was well received by the 32nd Annual International Film & TV Festival of New York where it was named a finalist in the Public Relations: Non-profit Fundraising category.

As the video crew donated their time to meet this community service need, it also focussed on to two other projects: a videotape about EDC's greenness mapping activities and a program for the Western Mapping Center in Menlo Park, CA.

The Greenness Mapping video is a six-minute tape featuring an animated vegetation time-series generated by Jay Feuquay, Information Sciences Supervisor, on the Data Center's Pixar computer imaging system.

The video, titled "Northern Great Plains Greenness Mapping," demonstrates how the EDC and the National Weather Service uses data derived from Advanced Very High Resolution Radiometer (AVHRR) sensors aboard NOAA weather satellites to produce an index of vegetation condition, or greenness.

According to Jeff Eidenshink, Science & Applications Branch, these data were used to monitor grassland fire danger and drought conditions throughout the Northern Great Plains during the 1988 and 1989 growing seasons. Eidenshink hopes that a similar videotape can be produced in the near future highlighting vegetation condition, or greenness, for future growing seasons for the entire nation, continent, or globe.

The "Northern Great Plains Greenness Mapping" video was completed two weeks before the Western Mapping Center program. Running 13-and-a-half minutes, "The USGS Western Mapping Center" video was produced as an introduction to the Survey's Menlo Park, California facility. The purpose of this show is to provide visitors to the Survey's Western Mapping Center (WMC) with a better understanding of the activities and programs of the National Mapping Program. More specifically, the program showcases the technologies and applications of the WMC through two cooperative application projects-the Firescope Program and the San Mateo County GIS project.

With the previously mentioned projects put to bed, the Technical Information Section concentrated its efforts on two more extensive external video projects. The Department of the Interior's Digital Cartographic Coordinating Committee (IDCCC) asked the Data Center to produce a videotape for middle-and-upper management personnel about the wide uses of geographic information systems within its bureaus and offices. Officials with IDCCC wanted the program, "Geographic Information Systems: An Executive Briefing," to include as much scenic beauty, wildlife, and diverse topographic areas of the nation as the $30,000 budget would allow.

"The target audience is middle and upper management having an interest in, but little or no technical knowledge of, geographic information systems technologies as applied in the Department of the Interior," said Claude Christensen, a member of the IDCCC representing the U.S. Fish and Wildlife Service. "The objective of the video is an increased awareness and interest level of the viewer with regard to what GIS is, and how it can be used in practical applications."

Completed in December of 1990, the 20-minute program meets these requirements by including videotape from several national parks, wildlife refuges, mines, indian reservations, and government and private industry facilities.

All of the video acquired for TIS videos is archived for use on future projects. An upcoming project that will use


*Since EDC staff produced a video featuring an animated time-series of vegetation, or "greenness" of the 1989 growing season within the Northern Great Plains, EROS scientists have used AVHRR data to map the 1990 growing season throughout the conterminous United States.*

*Don Becker acquires a rack-focus shot near Lake Mead, Nevada for a recently completed Department of Interior GIS video production.*

*Technical Information Section video crew members on location in Montana. Mark Barber, Video Writer/Producer (kneeling) operates the talent's teleprompter. Don Becker, Production Director/Videographer (back to camera) records narration from on-camera talent Mark Ovenden (seated). Assisting with a light reflector panel is Stan Moll, Alaska Field Office geologist.*

much of the videotape acquired for the IDCCC video will be a tape for the USGS Director's Office, "USGS: Earth Science in the Public Service." Once the Public Affairs Office at USGS headquarters makes its final script revisions, production will begin on this 20-minute tape for the new USGS Vistor's Center.

Gail Wendt, USGS Public Affairs Officer, sees the video featuring two basic themes.

"We'd like to steer away from a segmented approach of, 'This is National Mapping...this is Geology,' and to stress unifying themes among the divisions and the inter-relationship of the earth sciences—all in the name of the public good."

Until the TIS receives final script approval on the Director's tape, the TIS "vidiots" will keep plenty busy revising the EDC introductory slideshow, working on a program featuring EDC Global Change activities, and providing three new lobby displays.

# A Center Banquet

As part of the Friendship Tree program this past Christmas, Center employees contributed over $400 to purchase milk, coffee, and baby food for the Banquet organization in Sioux Falls. Center employees were later invited to serve in the Banquet's ecumenical outreach program the evening of February 12. Planners hoped to sign up the 45 volunteers needed to prepare and serve the soup and sandwich meal planned for that evening and to enlist volunteers to provide the anticipated 50 apple pies needed. As of January 11 over 100 employees signed up to work and over 65 pies were pledged.

The Banquet, founded in 1985, is a non-profit volunteer organization established to provide meals four times a week to 300-400 hungry and underprivileged people in Sioux Falls. In 1990, for example, 5500 volunteers, working through their businesses, civic, or church organizations, served just over 50,000 meals (13,000 of which were to children 12 years old or younger). The EROS volunteers were responsible for providing the meal Tuesday evening, February 12. 40 gallons of soup were needed, 340 sandwiches and the apple pies. Employees prepared the meals, transported materials to the Banquet, served the meals, ate with the guests, coordinated a brief spiritual program, and cleaned up the kitchen at the end of the evening. A collection box was set up in the cafeteria for cash donations to cover the cost of the food for the meal.

The next issue of the ***Center Scene*** will cover, in more detail, this important sharing in the community.

# Sioux Falls — A New View

"Sioux Falls: An Aerial Perspective," the EDC lobby display illustrating changes and growth of the Sioux Falls area from 1937 to the present, was recently brought up to date with the addition of a new air photo mosaic. The display, clearly the favorite of most lobby visitors, is a particular hit with long-time Sioux Falls residents who can trace developments with which they are familiar. Also, the series of photos clearly demonstrates several of the unique attributes of aerial images that contribute to their value to land managers and planners, namely, the unique vantage point (showing things in a way not possible from the ground); the synoptic view (showing large features in their entirety); and a permanent record of conditions at a particular point in time.

On April 2, 1990 the aerial photos used for the mosaic were acquired as an extension of the National Aerial Photography Program (NAPP) coverage that was being flown over northwest Iowa, and were "discovered" by our Archive Management staff as they were being logged into the EDC archive. It was decided that a new mosaic was appropriate, as the most recent previous mosaic coverage used in the display dated from April 1984 (the 1987 image is not an air photo mosaic, but rather a portion of a single SPOT satellite image).

The mosaic was made from twelve 20"x20" prints, pieced together from the center photo outward, and spliced so as to minimize obvious lap-joints. The original mosaic was then photographed onto a single 9"x9" piece of film, and printed at a scale to match that of the existing mosaics in the display. The finished mosaic has been entered in the PAO file as display image number E770-3030BN.

# Update

***Profile of Women at Work***, a new publication by the U.S. Department of Interior, has finally been released. Profiles of over 100 women, selected from over 500 nominations, commemorate the significant contributions and achievements by women in the Department of Interior. As mentioned in the last ***Center Scene***, June Thormodsgard is one of the 24 chosen from the U.S. Geological Survey to be highlighted. If you would like to see the publication and read about this important initiative on the part of the Department of Interior, loan copies are available through the TRU or from the Technical and Administrative Services Office.

# NCGIA Meeting At EROS

Thirty professionals, from disciplines ranging from botany to human geography, met at the EROS Data Center December 3-5 as part of a series of "brainstorming" meetings of the National Center for Geographic Information and Analysis (NCGIA) to examine a set of problems involving remote sensing and geographic information systems.

The NCGIA was formed in 1988 and is organized around four distinct units: the administrative and communications center located at the University of California at Santa Barbara (UCSB) and the three research and education centers located at UCSB, the State University of New York at Buffalo, and the University of Maine at Orono. NCGIA has a five-year commitment from the National Science Foundation (NSF) with the possibility of a three-year renewal.

Research has been organized around a series of initiatives, or projects designed to investigate a theme, problem, or a set of impediments to make the use of geographic information systems (GIS) more widespread and valuable. The NSF proposal was for a total of 12 Initiatives, although a 13th has been defined and a 14th is in the proposal stage. Visitors representing government, academic, and corporate agencies worldwide, along with people from the NCGIA, participate in the Initiatives at the three university locations. A Research Initiative usually consists of many research subtopics that closely interact, influence, and advance work in other areas. Such an Initiative consists of a planning phase, specialist meetings, working groups undertaking intensive research, in-progress seminars (as needed), national or international conferences to present results, and new and outgrowth research.

The twelve Research Initiatives that have been planned to begin during the first three years of the Center's operation include:

Initiative 1: Accuracy of Spatial Databases
Initiative 2: Languages of Spatial Relations
Initiative 3: Multiple Representations
Initiative 4: Use & Value of Geographic Information in Decision Making
Initiative 5: Architecture of Very Large GIS Databases
Initiative 6: Spatial Decision Support Systems
Initiative 7: Visualization of the Quality of Spatial Information
Initiative 8: Expert Systems for Cartographic Design
Initiative 9: Institutions Sharing Spatial Information
Initiative 10: Temporal Relations in GIS
Initiative 11: Space-Time Statistical Models in GIS
Initiative 12: The Integration of Remote Sensing & GIS

The 30 professionals attending the specialist meetings at EDC were assembled to examine Initiative 12: The Integration of Remote Sensing and GIS. The primary goal of the meeting was to define a list of issues and priorities as remote sensing and GIS are integrated. The research for Initiative 12 is planned to take about two years, but hopefully will begin some ongoing research topics.

The results of this meeting will go into a technical publication at the National Center with manuscripts being sent to one of the professional journals. There also will be a set of sessions at the annual American Congress on Surveying and Mapping-American Society for Photogrammetry and Remote Sensing (ACSM-ASPRS) meetings in Baltimore in March, and meeting planners have talked with two different publishers about a monograph to be published about a year from now.

According to Jeff Star, a Research Fellow at the National Center for Geographic Information and Analysis and Manager of the Remote Sensing Unit at the UCSB, while there are many research problems in remote sensing and GIS, the two disciplines provide many other special problems when brought together.

"The processing flow, when you're trying to glue remotely sensed data together with conventional GIS data to make some decision gets extremely complicated. No one really knows, to my knowledge, how you really optimize that very complex set to make the best possible decision.

There are very fundamental institutional problems in terms of data sharing, in terms of one agency producing data and characterizing it in a way that is meaningful to another agency so that they don't have to create their own from scratch."

Considerations such as these are high on the minds of people such as Don Lauer, Chief of EDC's Science and Applications Branch. Lauer was selected to be one of the leaders of Initiative 12. He became involved with this Initiative from its inception during the year he spent at UCSB completing his Doctorate degree. His doctoral dissertation focused on institutional issues in acceptance of remote sensing technology, which fit nicely into the theme of Initiative 12.

One reason that Initiative 12 is being given immediate priority is because of the interest expressed to NCGIA by many people, specifically in NASA and the USGS.

According to Star, scientific staff from both agencies were involved in the planning for Initiative 12 when the Survey volunteered to host the meeting at the Data Center.

"The Data Center is a natural participant because of its long history of providing data, of creating data sets, and also, making them available for a wide range of users.

Government agencies all support university-types who occassionally save up the money to buy a few things from you. We have a long history of work at Santa Barbara with the Data Center as the Earth Science Information Center for California. When folks at the Data Center, Don Lauer...Dave Greenlee, suggested that it might be possible to hold the Initiative here, we thought that that would be great!"

By hosting a meeting such as this, the Data Center clearly benefits in two ways. According to Dave Greenlee, EDC Remote Sensing Scientist/Geographic Applications, it really helps the Data Center's visibility.

"At EDC, we have been working on the integration of remote sensing and GIS for many years, and this Initiative gives us a chance to showcase our efforts in the Specialist Meeting, ASPRS special sessions, and a monograph to be published next year.

Secondly, the problems of integrating remote sensing and GIS tools and technologies are very important to the Data Center's future. Our role in global change studies and our EOS responsibilities are contingent on how well we can solve problems in the integration of remote sensing and GIS technologies. The Data Center has been and will continue to be at the forefront of this research."

Another benefit that comes from working on these Initiatives is that people from various places can get together for cooperative research. According to Star, the NCGIA and EROS are working on a two-way cooperative research program that would include an on-site "temporary duty," or sabbatical.